

Riga event timers: principles of operation and performance characteristics

Yu. Artyukh.

Institute of Electronics and Computer Science, Riga, Latvia

Unlike the traditional event timers, the Riga event timers use different event timing method. According to this method, each input event is converted to a derived analog signal with some predefined shape. Then this signal is digitised using a typical A/D converter and digitally processed to estimate its position relative to the periodic sampling pulse sequence. In this way good performance characteristics can be combined with hardware simplicity where highly specialized circuits are almost fully replaced by the common-used DSP facilities. That is why the Riga event timers are characterised by an attractive price-performance ratio as compared to the other timing instruments of similar quality.

The main performance characteristics (timing resolution, maximum measurement rate, etc), both already offered and achievable in principle for the Riga event timers, are considered. Specifically, it is shown that the single shot timing resolution of about 3-4 ps RMS is quite achievable. Taking into account that the better performance characteristics are, the higher unit price, the final discussion is focused on the choice of typical performance characteristics for the event timers that are especially needed for SLR applications at present and in the nearest future.